Chapter 3
Preferences

Li Yan(李艳)
School of Economics
Central university of Finance and Economics

Consumer Behavior

- There are three steps involved in the study of consumer behavior

1. *Consumer Preferences*
   - To describe how and why people prefer one good to another
2. *Budget Constraints*
   - People have limited incomes

Consumer Behavior

3. Given preferences and limited incomes, what amount and type of goods will be purchased?
    - What combination of goods will consumers buy to maximize their satisfaction?

Consumer Preferences

- Describe preferences
- Indifference curves (无差异曲线)
- Well-behaved preferences
- Marginal rate of substitution (边际替代率)

Rationality in Economics

- Behavioral Postulate:

  A decision-maker always chooses its most preferred alternative from its set of available alternatives

- So to model choice we must model decision-makers' preferences.

Preference Relations

- Comparing two different consumption bundles, x and y:
  - **strict preference** (严格偏好): x is more preferred than y
  - **Indifference** (无差异): x is exactly as preferred as y
  - **weak preference** (弱偏好): x is as at least as preferred as is y

Assumptions about Preference Relations

- **Completeness** (完备性): For any two bundles x and y it is always possible to make the comparison between x and y

- **Reflexivity** (反身性): Any bundle x is always at least as preferred as itself

Assumptions about Preference Relations

- **Transitivity** (传递性): If
  x is at least as preferred as y, and
  y is at least as preferred as z, then
  x is at least as preferred as z.

Rational Preference

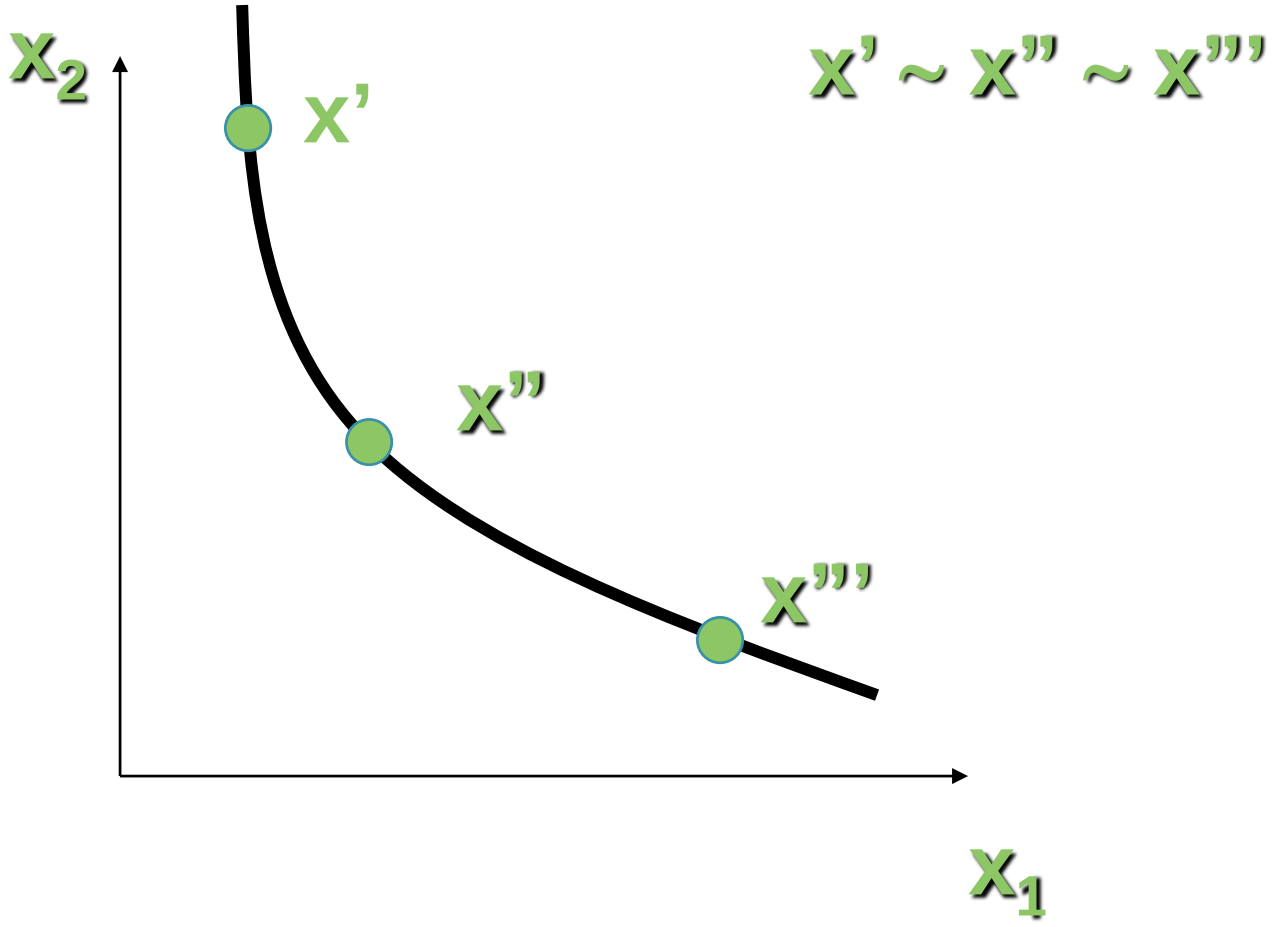
- Rational $\Leftrightarrow$ complete and transitive
- Completeness: $\forall\ x, y \in X, x \succcurlyeq y$ or $y \succcurlyeq x$ or both
- Transitivity: $\forall\ x, y, z \in X, x \succcurlyeq y\ \ \&\ \ y \succcurlyeq z \rightarrow x \succcurlyeq z$
- Reflexivity: $\forall\ x \in X, x \succcurlyeq x$

- Violation of completeness - common experience
- Violation of transitivity - (1) Perceptible differences（恰可识别阀值）; (2) Framing problem;(3) Condorcet paradox（康多塞悖论）Jack（a > b > c）Jill（b > c > a）,Tom（c > a > b）; (4) Change of taste (addictive behaviors)

Indifference Curves

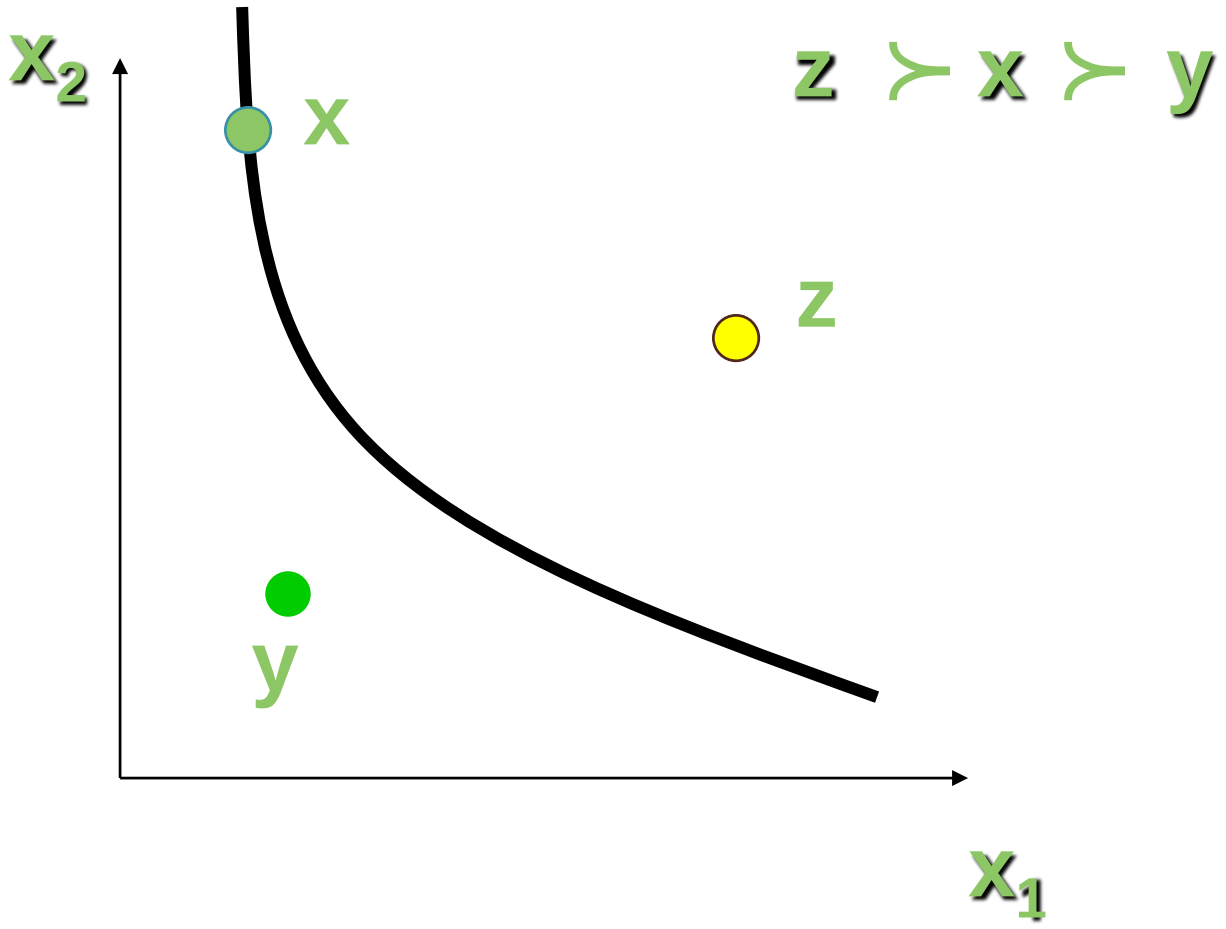
- Take a reference bundle x'. The set of all bundles equally preferred to x' is the indifference curve containing x'; the set of all bundles $y \sim x'$.

Indifference Curves

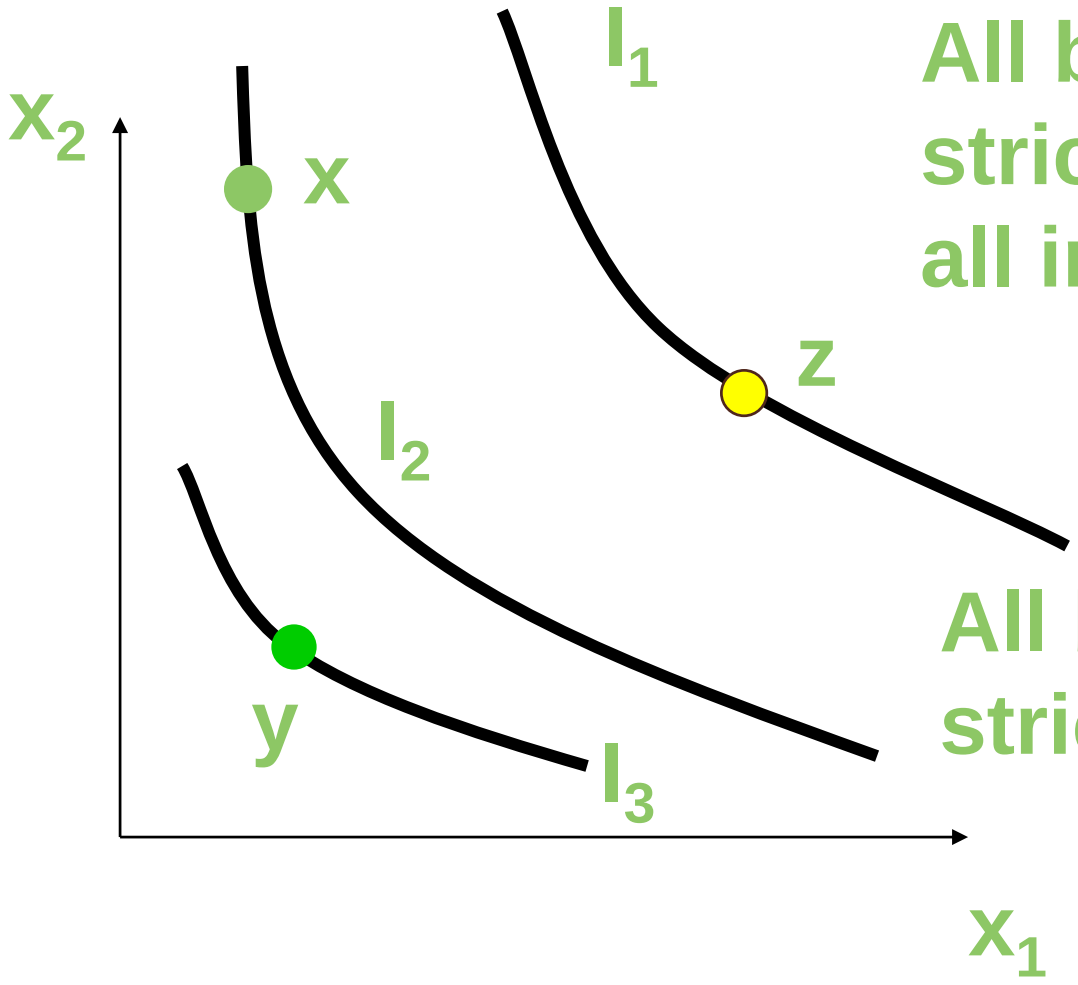


$x' \sim x'' \sim x'''$

Indifference Curves



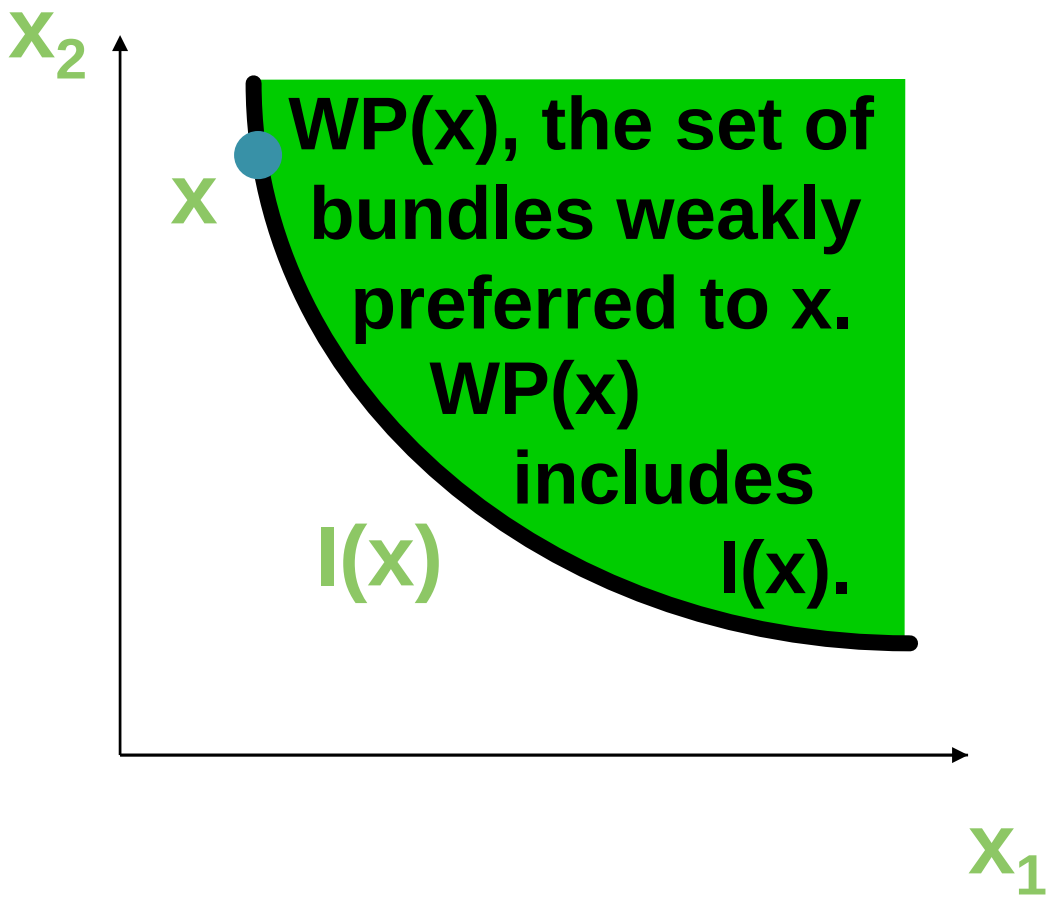
Indifference Curves



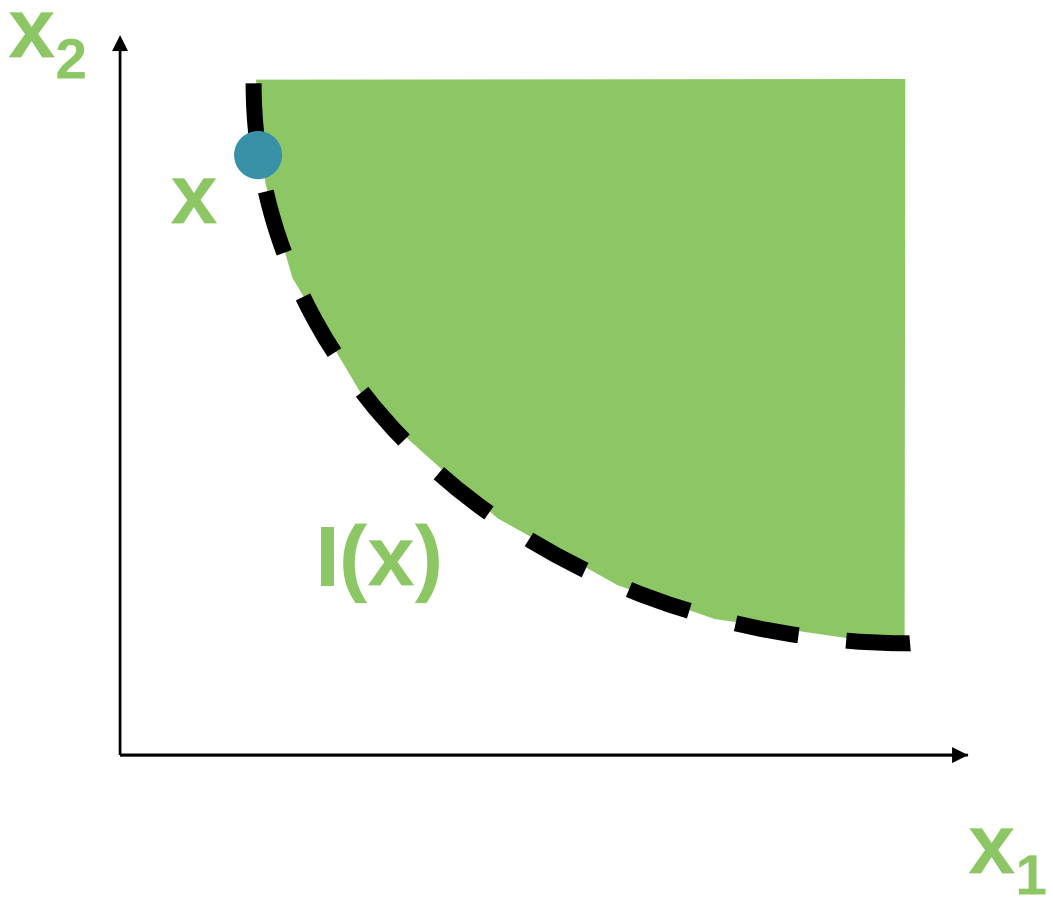
All bundles in I_1 are strictly preferred to all in I_2.

All bundles in I_2 are strictly preferred to all in I_3.

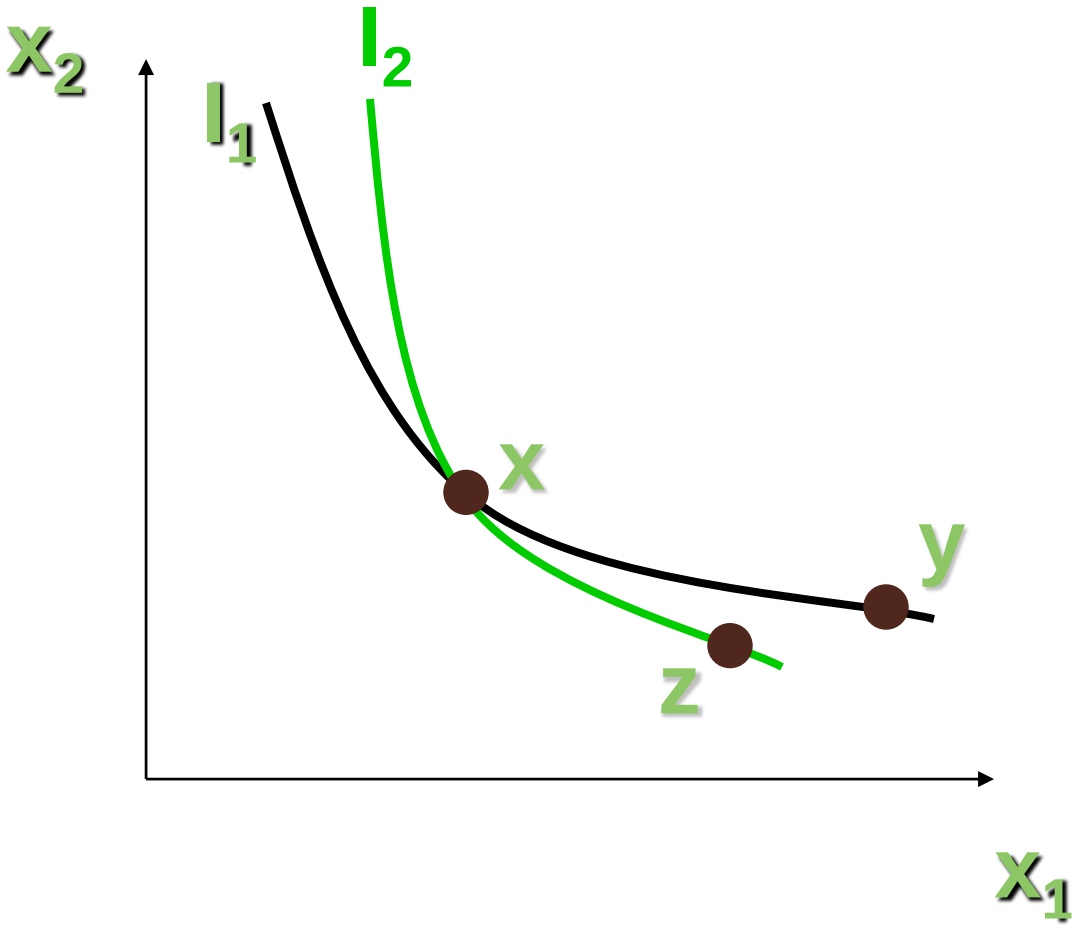
Weakly Preferred Set (弱偏好集)



Strictly Preferred Set (严格偏好集)



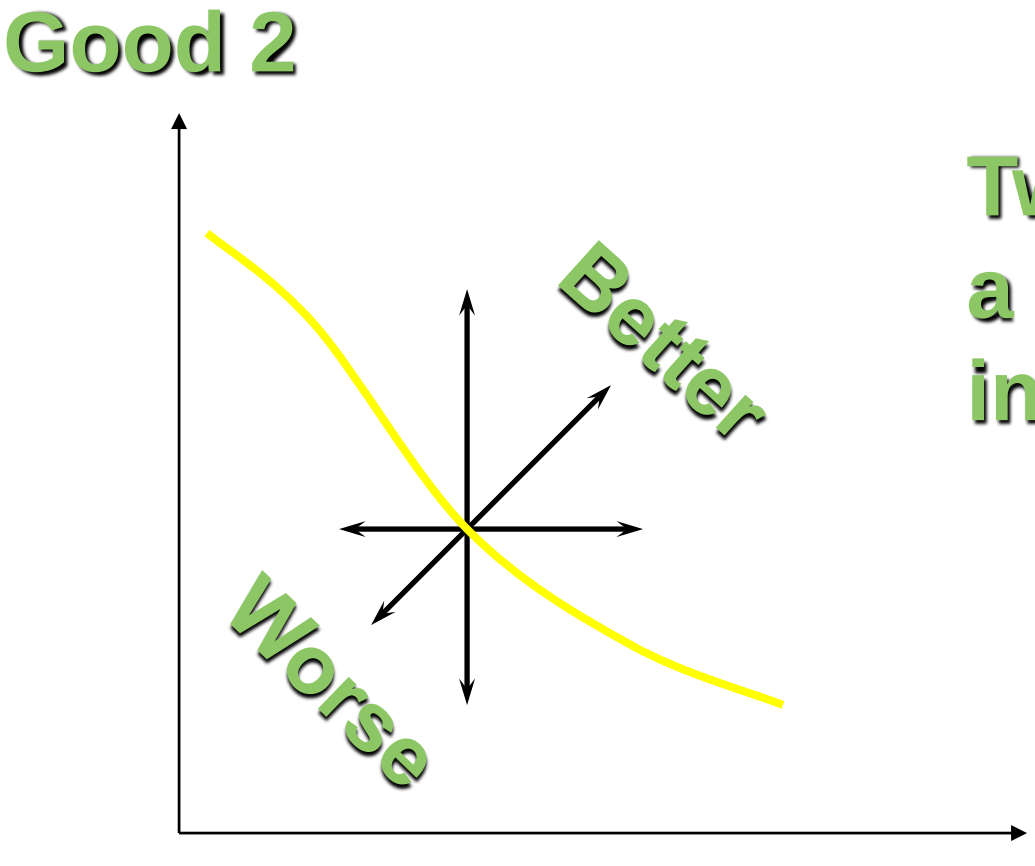
Indifference Curves Cannot Intersect



Slopes of Indifference Curves

- When more of a commodity is always preferred, the commodity is a **good.**
- If every commodity is a good then indifference curves are negatively sloped.

Slopes of Indifference Curves

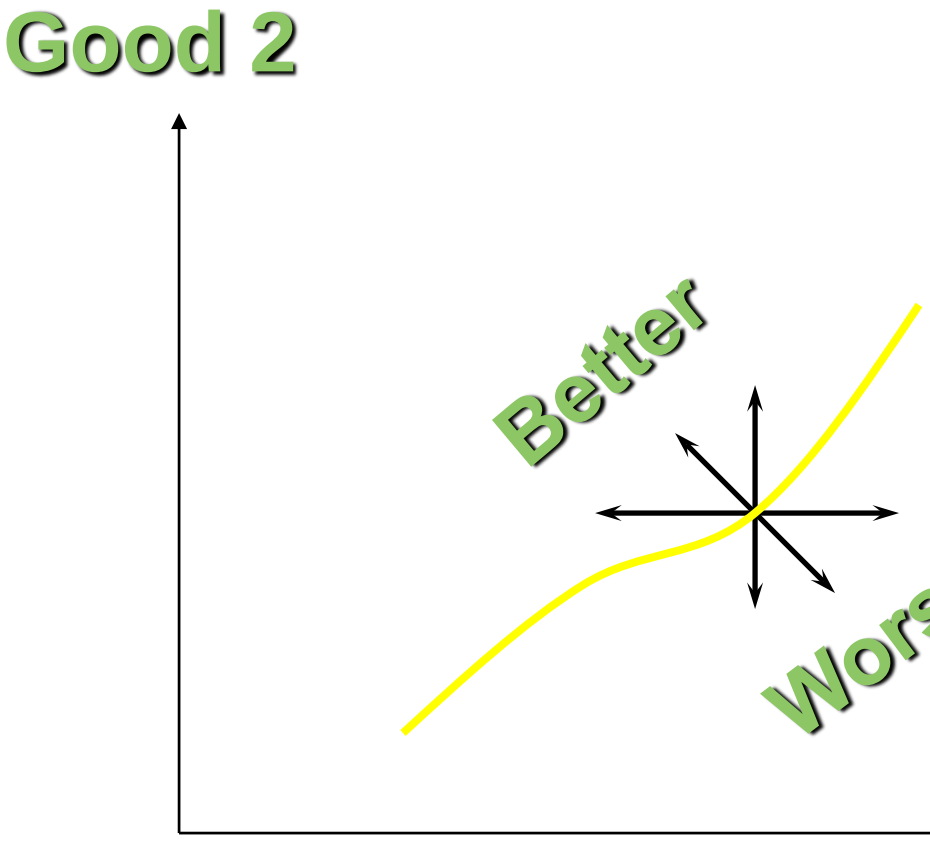


Two goods ➡
a negatively sloped
indifference curve.

Slopes of Indifference Curves

- If less of a commodity is always preferred then the commodity is a **bad**.

Slopes of Indifference Curves

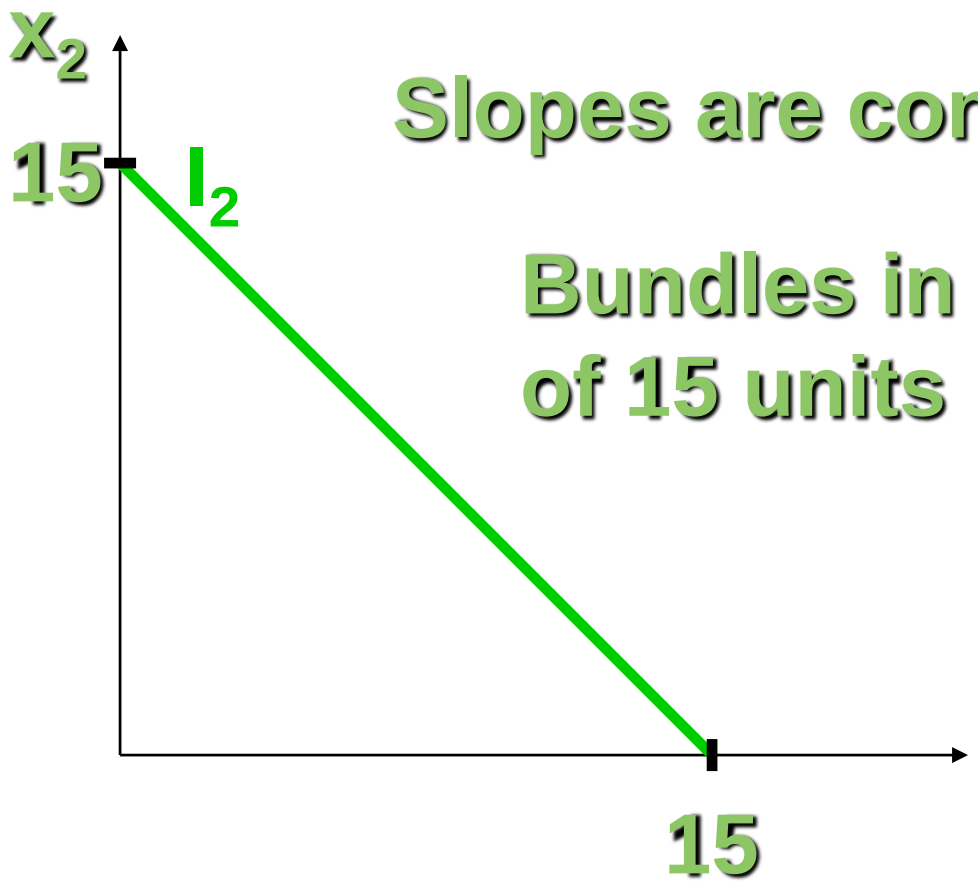


One good and one bad → a positively sloped indifference curve.

Examples

- Perfect substitutes (完全替代)
- Perfect complements (完全互补)
- Satiation (餍足)

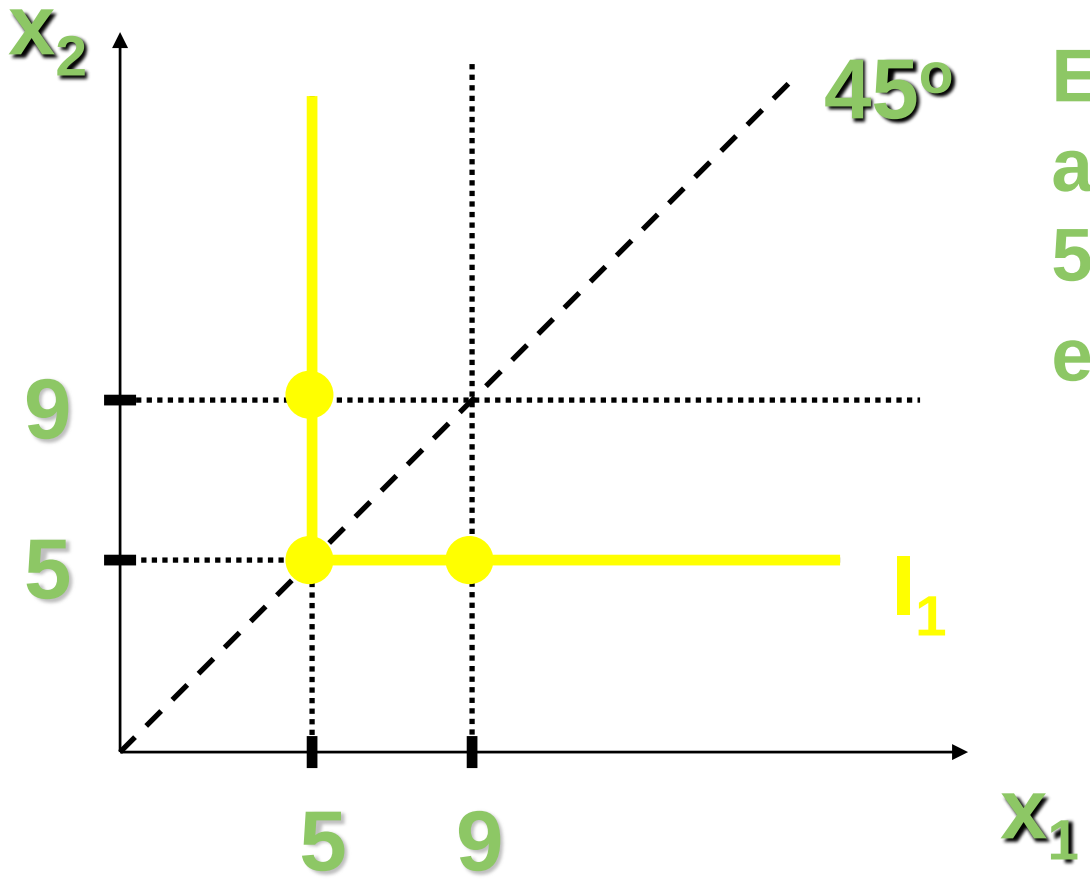
Extreme Cases of Indifference Curves: Perfect Substitutes



Slopes are constant at - 1.

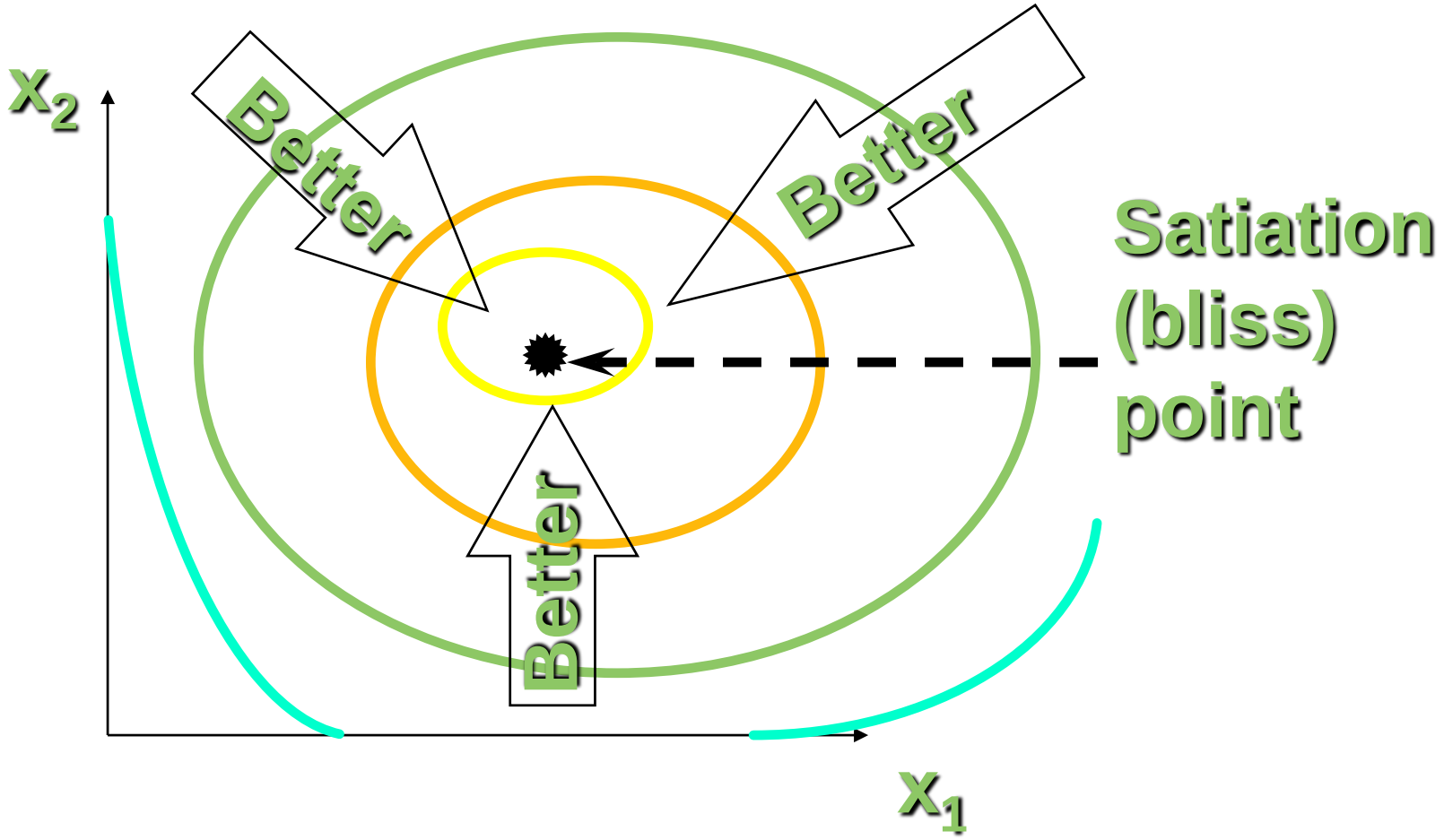
Bundles in I_2 all have a total of 15 units

Extreme Cases of Indifference Curves: Perfect Complements



Each of (5,5), (5,9) and (9,5) contains 5 pairs so each is equally preferred.

Indifference Curves Exhibiting Satiation



Well-Behaved Preferences

- A preference relation is "well-behaved" if it is
  - Monotonic (单调) and convex (凸状).
- Monotonicity: More of any commodity is always preferred (*i.e.* no satiation and every commodity is a good).

Monotonicity

- Monotonicity:
  - $y \gg x \rightarrow y \succ x$
  - $y \gg x \quad \Leftrightarrow \forall \ell = 1,2 \ldots L, y_\ell > x_\ell$
- Strong Monotonicity:
  - $y > x \rightarrow y \succ x$
- Weak monotonicity
  - $y \geq x \rightarrow y \succ x$

Well-Behaved Preferences

- **Convexity**: Mixtures of bundles are (at least weakly) preferred to the bundles themselves.

- E.g., the 50-50 mixture of the bundles x and y is

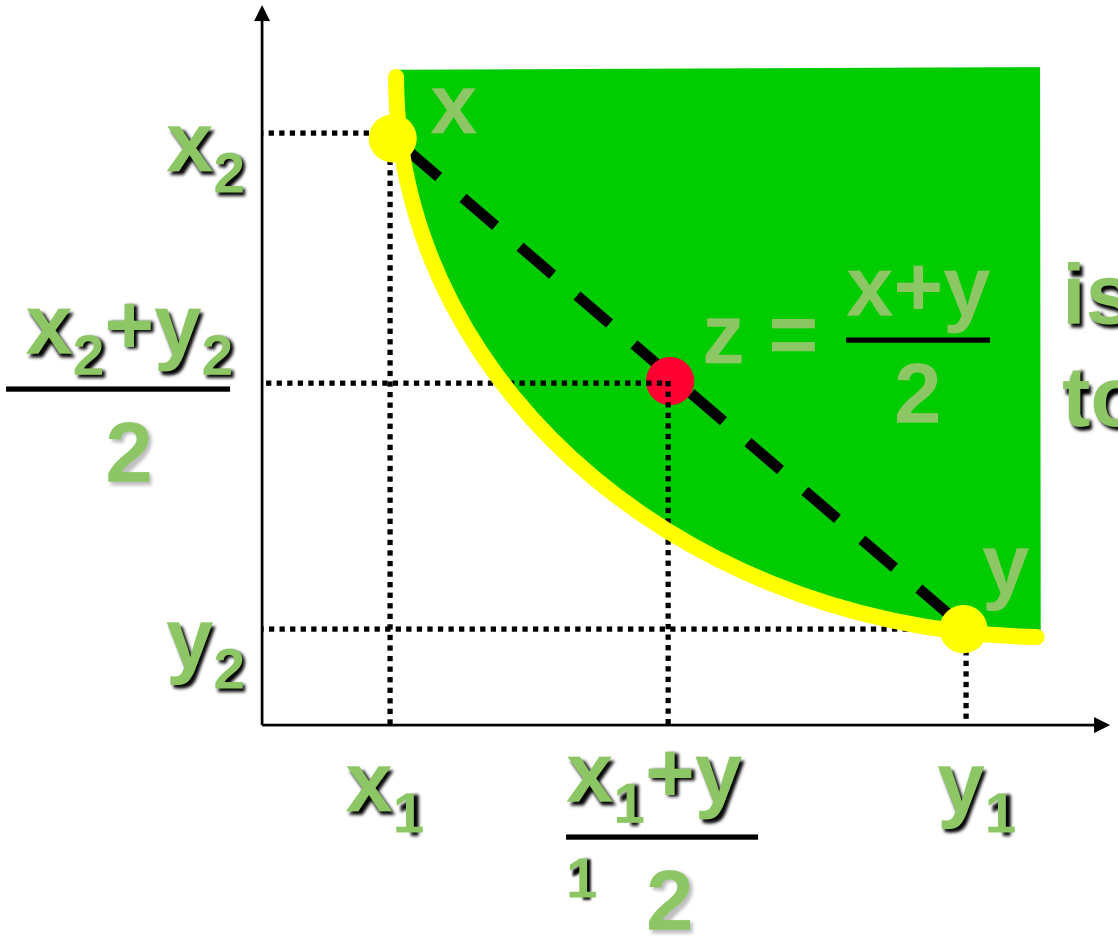
$$z = (0.5)x + (0.5)y.$$

z is at least as preferred as x or y.

Convexity:

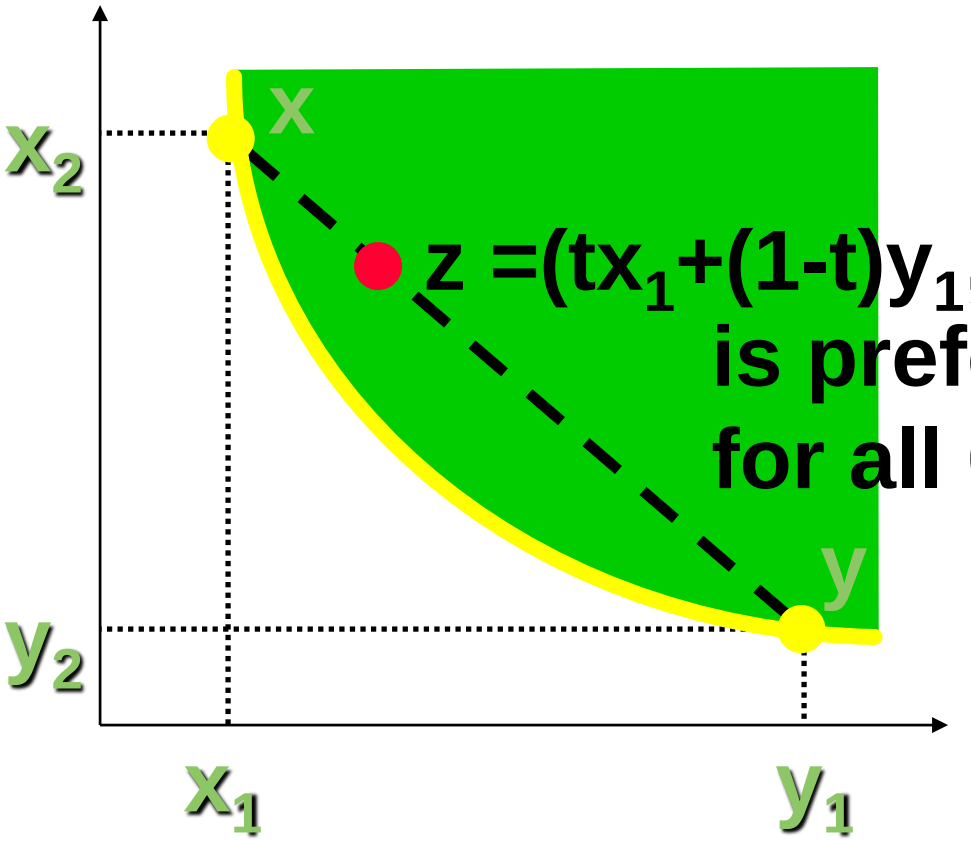
- Convexity: $y \succcurlyeq x \;\&\; z \succcurlyeq x \rightarrow \forall\, \alpha \in [0, 1]\,, \alpha y + (1 - \alpha)z \succcurlyeq x$
- Strict Convexity: $y \succcurlyeq x \;\&\; z \succcurlyeq x \;\&\; y \neq z \rightarrow \forall\, \alpha \in (0, 1)\,, \alpha y + (1 - \alpha)z \succ x$
  - Note: Convex preference $\Longrightarrow$ Quasiconcave utility function

Well-Behaved Preferences -- Convexity.



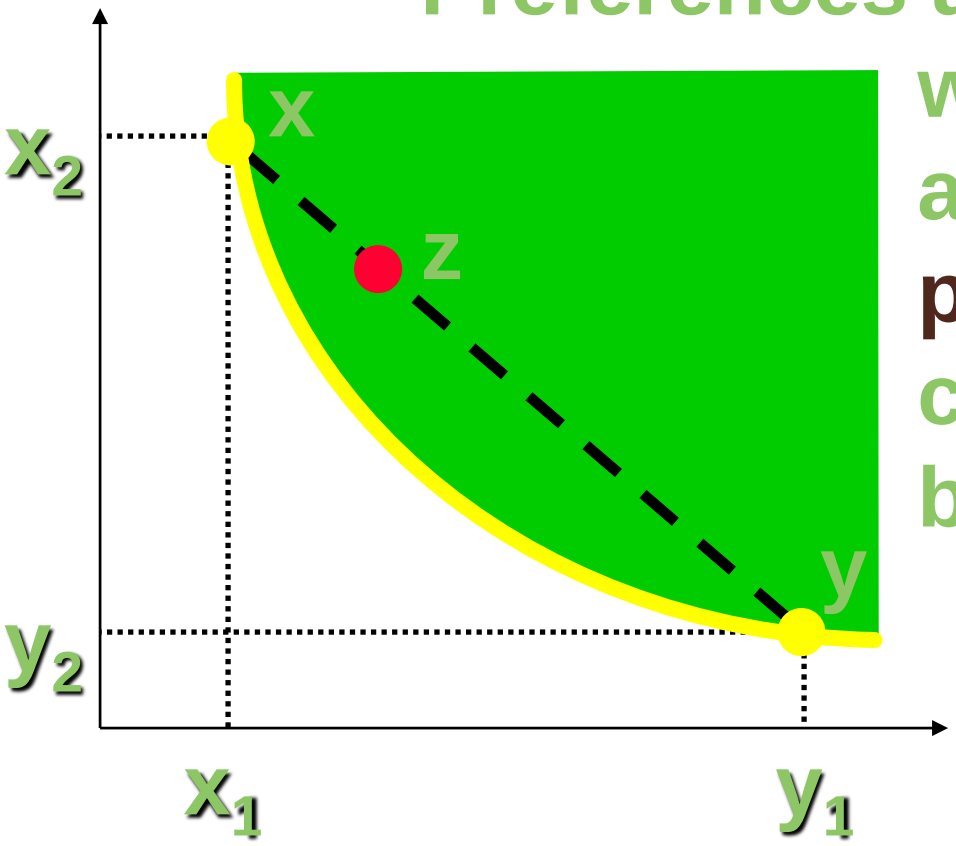
is strictly preferred to both x and y.

Well-Behaved Preferences -- Convexity.



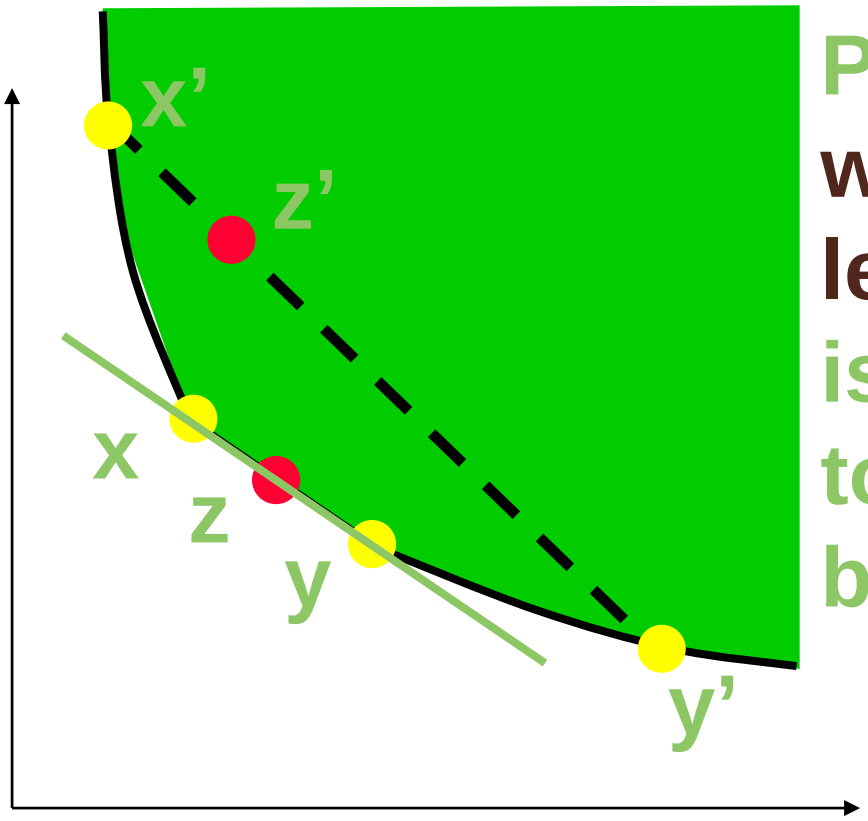
$z = (tx_1 + (1-t)y_1,\ tx_2 + (1-t)y_2)$ is preferred to x and y for all $0 < t < 1$.

Well-Behaved Preferences -- Convexity.



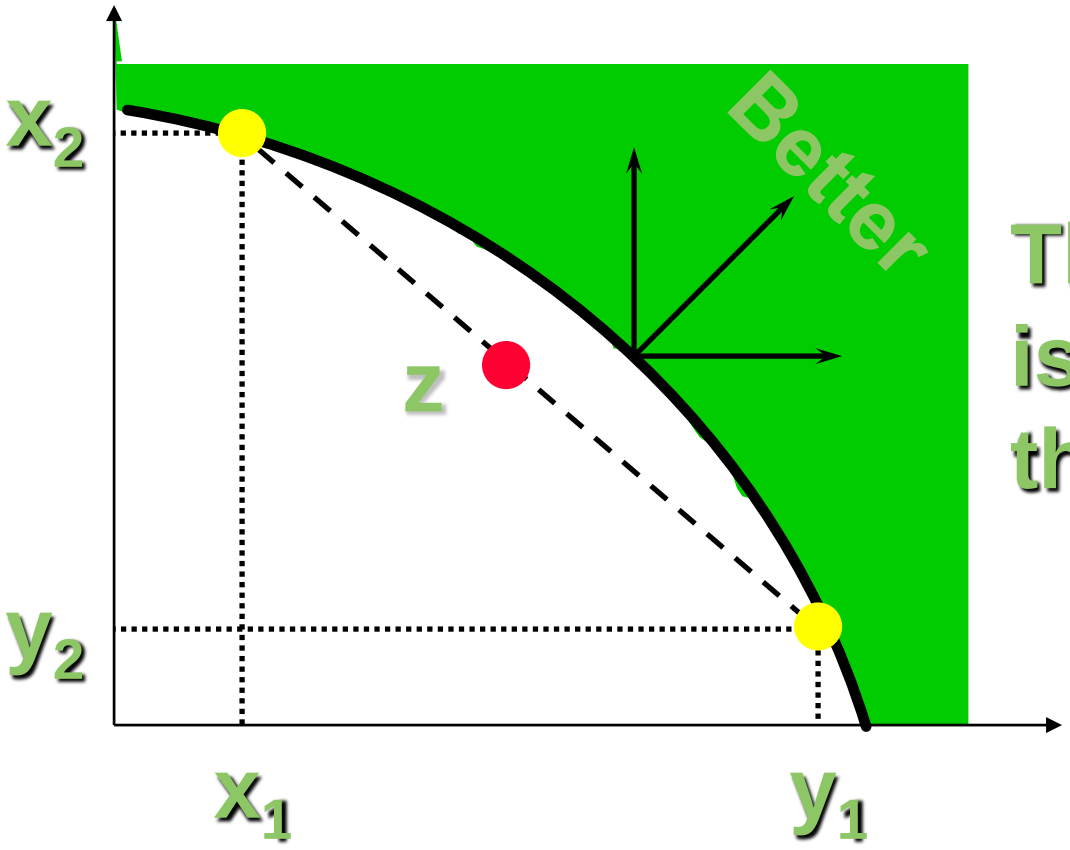
Preferences are **strictly convex** when **all** mixtures z are **strictly preferred** to their component bundles x and y.

Well-Behaved Preferences -- Weak Convexity.



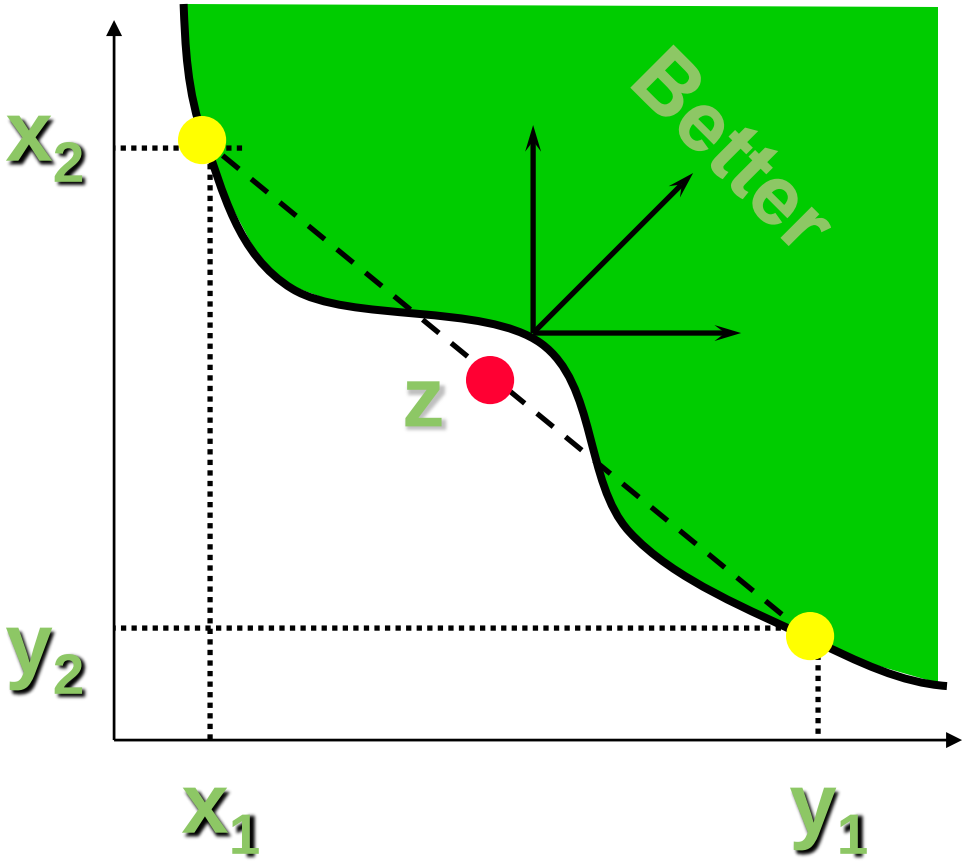
Preferences are weakly convex if at least one mixture z is equally preferred to a component bundle.

Non-Convex Preferences



The mixture z is less preferred than x or y.

More Non-Convex Preferences



The mixture z is less preferred than x or y.

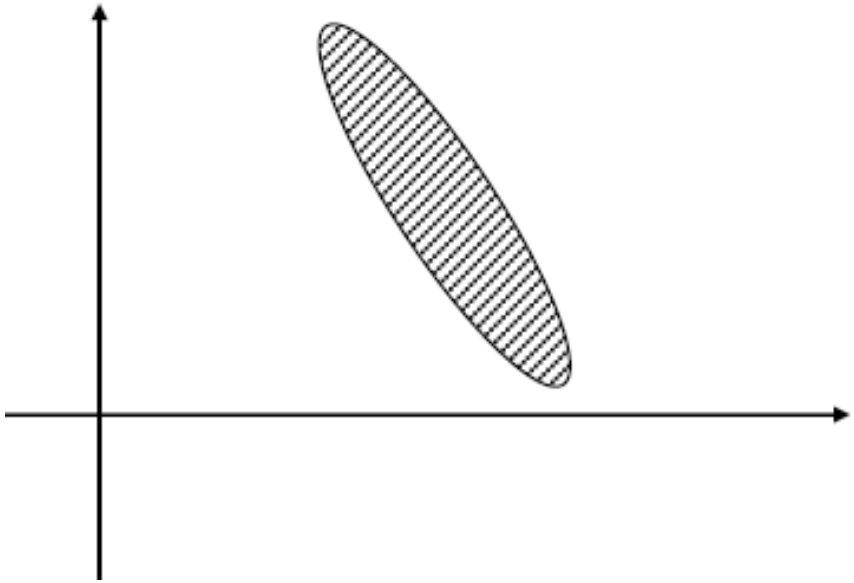
Convexity

- Convexity can be interpreted in terms of diminishing marginal rates of substitution.
- Convexity can also be viewed as the formal expression of a basic inclination of economic agents for diversification.

Nonsatiation

- Nonsatiation: $\forall\, x \in X, \exists y \in X$ such that $y \succ x$
- Local Nonsatiation: $\forall\, x \in X, \quad \forall\, \varepsilon > 0,$ $\exists\, y \in X$ such that $\|y - x\| \leq \varepsilon$ and $y \succ x$.

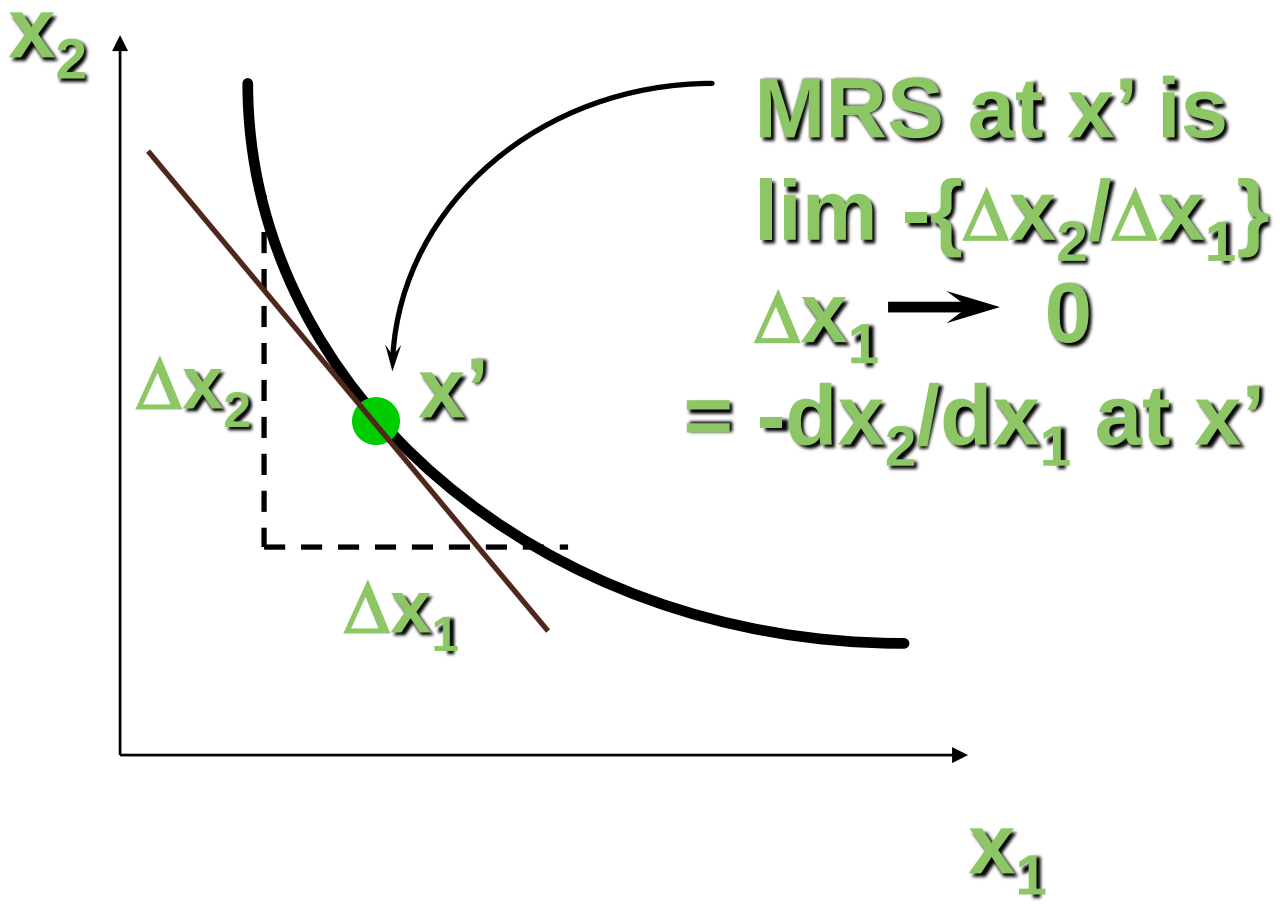
Not Satisfied Local Nonsatiation



Slopes of Indifference Curves

- The slope of an indifference curve is its marginal rate-of-substitution (MRS).
- How can a MRS be calculated?
- MRS at x' is the slope of the indifference curve at x'

Marginal Rate of Substitution

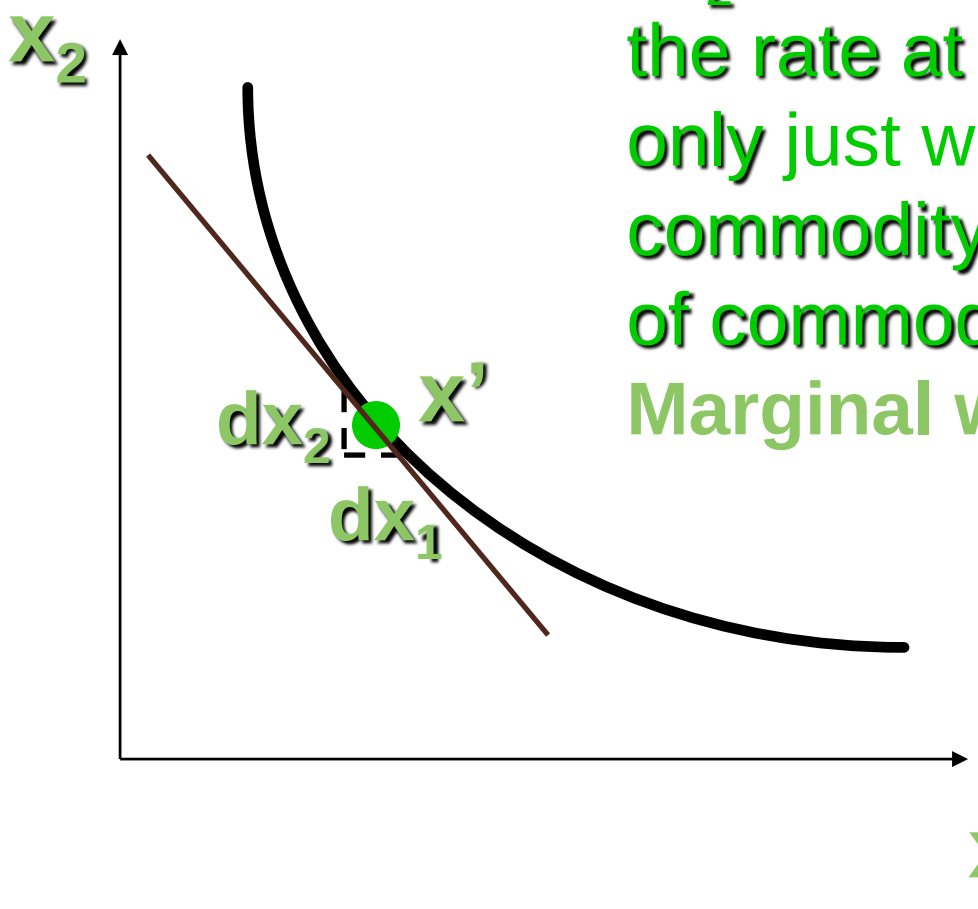


MRS at x' is

$\lim_{\Delta x_1 \to 0} -\{\Delta x_2/\Delta x_1\}$

$= -dx_2/dx_1$ at x'

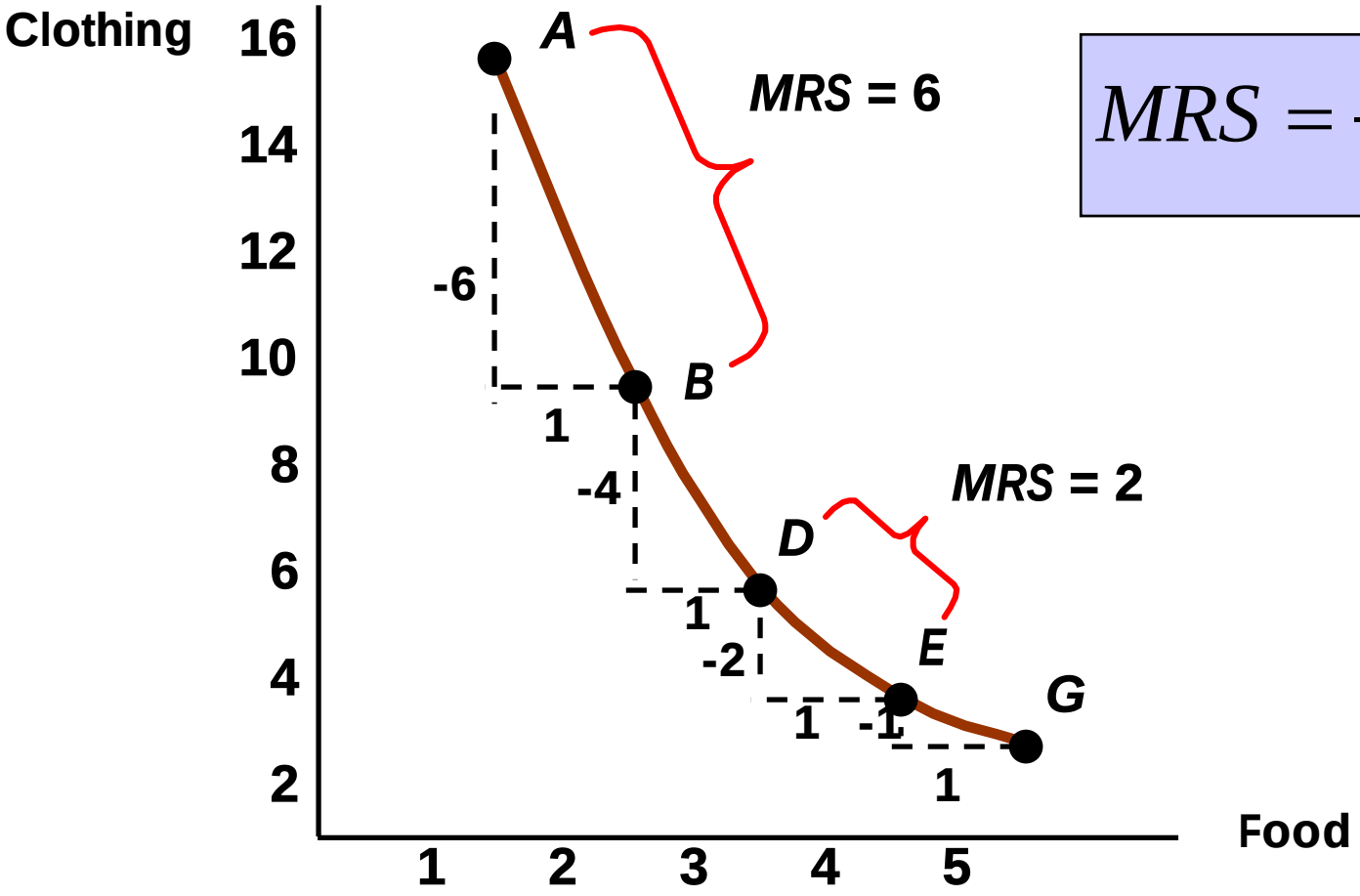
Marginal Rate of Substitution



$dx_2 = MRS*dx_1$ so, at x', MRS is the rate at which the consumer is only just willing to exchange commodity 2 for a small amount of commodity 1.

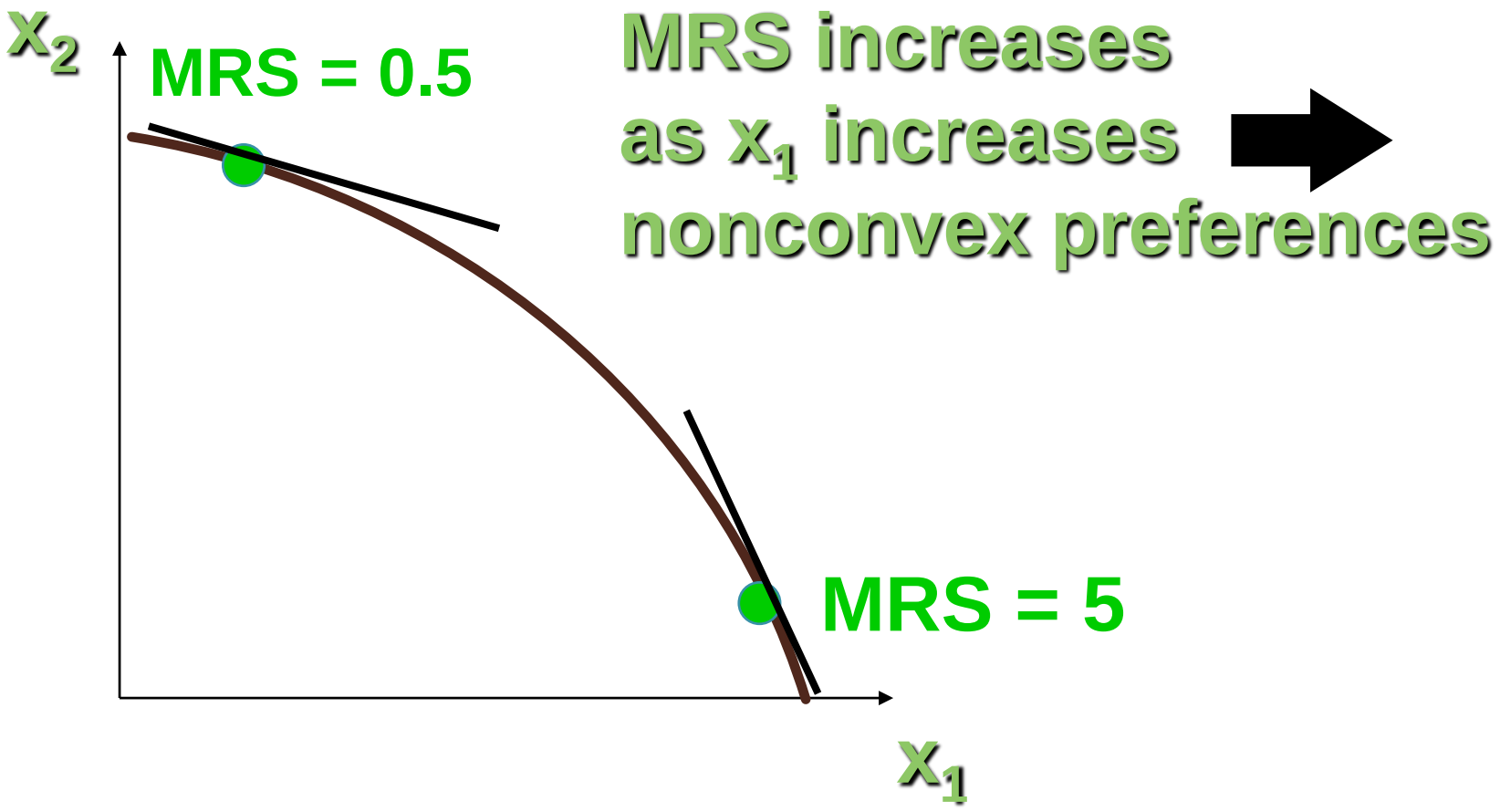
Marginal willingness to pay.

Marginal Rate of Substitution



$$MRS = -\Delta C / \Delta F$$

MRS & Ind. Curve Properties



MRS & Ind. Curve Properties